GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION
SPONSORED PROJECT INITIATION

No action
4 OCT 5
OK

Date: October 21, 1976

Project Title: A "Service" Contract to Operate and Maintain a COMSAT Radiometirc Receiving Terminal.

Project No: A-1913

Project Director: Mr. R. W. Wallace

Sponsor: COMSAT Laboratories, Clarksburg, Maryland 20734

Agreement Period: From October 5, 1976 Until October 5, 1977

Type Agreement: Purchase Order No. L 41819

Amount: $5,000

Reports Required: Monthly Progress Reports

Sponsor Contact Person (s):

Technical Matters

Contractual Matters
(thru OCA)

John G. Ernst
COMSAT Laboratories
Clarksburg, Maryland 20734

Defense Priority Rating: None

Assigned to: Electronics Technology Laboratory (School/Laboratory)

COPIES TO:

Project Director
Division Chief (EES)
School/Laboratory Director
Dean/Director—EES
Accounting Office
Procurement Office
Security Coordinator (OCA)
Reports Coordinator (OCA)
Library, Technical Reports Section
Office of Computing Services
Director, Physical Plant
EES Information Office
Project File (OCA)
Project Code (GTRI)
Other _____

CA—3 (3/76)

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION

SPONSORED PROJECT TERMINATION

Date: 4/27/78

Project Title: A "Service" Contract to Operate and Maintain a COMSAT Radiometric Receiving Terminal."

Project No: A-1913

Project Director: R. W. Wallace

Sponsor: COMSAT Laboratories, Clarsburg, MD

Effective Termination Date: 4/5/77

Clearance of Accounting Charges: 4/5/77

Grant/Contract Closeout Actions Remaining:

X Final Invoice and Closing Documents

__ Final Fiscal Report

__ Final Report of Inventions

__ Govt. Property Inventory & Related Certificate

__ Classified Material Certificate

__ Other _____

Assigned to: Electronics Technology Laboratory (School/Laboratory)

COPIES TO:

Project Director
Division Chief (EES)
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Accounting Office
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Project File (OCA)
Project Code (GTRI)
Other _____

CA—4 (3/76)

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

10 November 1976

COMSAT Labs
P. O. Box 115
Clarksburg, MD 20734

Attention: Mr. John G. Ernst

Subject: Monthly Letter Report No. 1
P. O. No. L41819

Gentlemen:

The contract was initiated on 5 October 1976. After receiving information from COMSAT Labs regarding the structure of the antenna, a support was designed and will be fabricated in the machine shop. The structure will be ready for an early December delivery of the radiometer. It has been decided to place the equipment in the Communications Lab with the antenna located on the roof of the Electronics Research Building. A cable length of 75 feet will be sufficient to interconnect the equipment.

Respectfully submitted,

R. W. Wallace
Project Director

RWW:gh

Approved:

D. W. Robertson, Director
Electronics Technology Laboratory

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

6 December 1976

COMSAT Labs
P. O. Box 115
Clarksburg, MD 20734

Attention: Mr. John G. Ernst

Subject: Monthly Letter Report No. 2
P. O. No. L41819

Gentlemen:

The antenna support has been fabricated and is available for an early December installation. Until the radiometer is installed, there is no further activity to report.

Respectfully submitted,

R. W. Wallace
Project Director

RWW:gh

Approved:

D. W. Robertson, Director
Electronics Technology Laboratory

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

January 6, 1977

COSMAT Labs
P.O. Box 115
Clarksburg, MD 20734

Attention: Mr. John G. Ernst

Subject: Monthly Letter Report No. 3
P.O. No. L41819

Gentlemen:

During the month of December, the radiometer system was being assembled by COMSAT Labs, and delivery to Georgia Tech was postponed until January. All facilities at Georgia Tech have been prepared for the installation at that time.

Respectfully submitted,

R.W. Wallace
Project Director

RWW:mm

Approved:

D.W. Robertson, Director
Electronics Technology Laboratory

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

16 February 1977

COSMAT Labs
P.O. Box 115
Clarksburg, MD 20734

Attention: Mr. John G. Ernst

Subject: Monthly Letter Report No. 4
P.O. No. L41819

Gentlemen:

Delivery of the radiometer system has been delayed by COMSAT Labs. All facilities at Georgia Tech have been prepared for installation when the equipment is delivered.

Respectfully submitted,

R.W. Wallace
Project Director

RWW:mm

Approved:

D.W. Robertson, Director
Electronics Technology Laboratory

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

10 March 1977

COMSAT Labs
P.O. Box 115
Clarksburg, MD 20734

Attention: Mr. John G. Ernst

Subject: Monthly Letter Report No. 5
P.O. No. L41819

Gentlemen:

Delivery of the radiometer system has been delayed by COMSAT Labs. All facilities at Georgia Tech have been prepared for installation when the equipment is delivered.

Respectfully submitted,

R.W. Wallace
Project Director

RWW:mm

Approved:

D.W. Robertson, Director
Electronics Technology Laboratory

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

April 7, 1977

Mr. Joseph F. Donnelly
COMSAT Headquarters
950 L'Enfant Plaza, S.W.
Washington, D.C. 20024

Dear Mr. Donnelly:

Attached are the copies of Monthly Letter Report number 6 of P. O. No. L41819, a service contract to operate a COMSAT Labs radiometer. The first five reports were inadvertantly addressed to Mr. John G. Ernst at COMSAT Labs. I hope this has caused no inconvenience to you.

If you need any further information please call me at (404) 894-3544.

Sincerely,

R. W. Wallace
Project Director

RWW:am

Attachement

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

6 April 1977

COMSAT Headquarters
950 L'Enfant Plaza, S.W.
Washington, D.C. 20024

Attention: Mr. Joseph F. Donnelly

Subject: Monthly Letter Report No. 6
P. O. No. L41819

Gentlemen:

The COMSAT radiometer was received on March 22, 1977 and installed on March 24. It was noted that the noise diode was inoperable at that time. With the antenna positioned toward an azimuth of 180° and an elevation of 45°, significant interference from radio station WREK at 91.1MHz was noted. Rotating the antenna to an azimuth of 0°alleviated the problem.

Although the system had not been calibrated, daily variations were noted and an increase in noise was correlated with heavy rainfall on March 29. However, after about 9 AM of March 31 the system gave a constant output. No change in output resulted from the calibation procedure under both hot load and liquid nitrogen procedures. The IF output of the downcoverter was measured at a level of -78 dBm.

The system has been turned off until representatives of COMSAT Labs are able to come to Georgia Tech for official installation of the system.

Respectfully submitted,

R. W. Wallace
Project Director

RWW:am

Approved:

D. W. Robertson, Director
Electronics Technology Laboratory

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

May 6, 1977

COMSAT Headquarters
950 L'Enfant Plaza, S.W.
Washington, D.C. 20024

Attention: Mr. Joseph F. Donnelly

Subject: Monthly Letter Report No. 7
P. O. No. L41819

Gentlemen:

On April 29, Mr. Fabio Galante of COMSAT Labs came to Georgia Tech for the installation of the radiometer and the initial calibration. Mr. Galante brought a 91 MHz filter to place in the IF line to reduce the interference level of a local broadcast FM radio station. This filter reduced the interference to some extent. However, the spectrum viewed on the IF cable reveals the presence of other interfering signals in the FM band of 88 - 108 MHz. COMSAT will provide a replacement filter to further attenuate this interference.

The system calibration using the reference load and the hot load for calibration resulted in a correct level for the noise diode when it was actuated. However, the cold load and sky temperature values were 295 K and 286.9 K respectively which indicate that the interfering signals are of a high enough level to invalidate the low temperature measurements. The next calibration should be performed with the additional filter for more valid results.

Respectfully submitted,

R. W. Wallace
Project Director

RWW:am

Approved:

D. W. Robertson, Director
Electronics Technology Laboratory

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

7 June 1977

COMSAT Headquarters
950 L'Enfant Plaza, S.W.
Washington, D.C. 20024

Attention: Mr. Joseph F. Donnelly

Subject: Monthly Letter Report No. 8
P.O. No. L41819

Gentlemen:

During the month of May, the system was operated with the 91 MHz low pass filter in the IF line. However, the background noise level continued to be high enough to obscure meaningful data.

On May 20, a calibration was performed with the following results.

Item	Graph Deflection	Assumed Temperature
Reference	108 mm	342 K
Noise diode	94 mm	304 K
Hot load	96 mm	307 K
Cold load	82 mm	80 K
Sky	75 mm	

If the hot load and cold load temperatures are used for the calibration, the sky temperature is calculated to be -33 K, an obvious impossibility. This results from the assumption that the chart deflection with the cold load represents a temperature of 80 K. This is not true for two reasons: (1) the cold load surface is not really at that low of a temperature and (2) the background noise in the system is much greater than the value produced by the cold load.

Using the reference load and the noise diode for the calibration, the hot load temperature is calculated to be 309 K, which compares well with the measured 307 K, but the cold load and sky temperatures are calculated to be 271 K and 252 K respectively, which are too high. Their levels probably result from the background noise in the system.

On June 2 an 80 MHz low pass filter was received from COMSAT Labs and placed in the IF line. This filter eliminated much of the measurement fluctuation; however, it had a minimal effect on the actual measurement level. At this time the system appears to have a residual high noise level with resulting sky temperature measurements of dubious validity.

We feel that it would be useful for COMSAT to completely check out the system in its current location to verify correct operation.

Respectfully submitted,

R. W. Wallace
Project Director

RWW:lb

Approved:

D. W. Robertson, Director
Electronics Technology Laboratory

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

8 July 1977

COMSAT Headquarters
950 L'Enfant Plaza, S.W.
Washington, D.C. 20024

Attention: Mr. Joseph F. Donnelly

Subject: Monthly Letter Report No. 9
P. O. No. L41819

Gentlemen:

The radiometer was operated during June with both the 80 MHz and the 91 MHz low pass filters installed in the input signal line. These filters attenuate the interferring FM broadcast signals by about 12 dB. However, the levels of major interfering signals remain at -80 dBm and -90 dBm for the frequencies of 99.7 MHz and 94.1 MHz respectively, measured with a 3 kHz sweep bandwidth.

During the month of June, rainfall was extremely light. Some measurements were missed on June 5, 12, and 19 due to the paper in the strip chart recorder running out and on June 7 and 17 due to ink running out or clogging of the pen. Some difficulties were periodically experienced with the strip chart pen during the period in that it would not feed the ink consistently. At the present time, the pen is operating properly.

We presently have 10 rolls of strip chart paper, four cartridges of blue ink, and six cartridges of red ink. Based on the current expenditure rate the paper supply will last eight weeks, the blue ink two weeks, and the red ink 20 weeks.

Respectfully submitted,

Ronald W. Wallace
Project Director

RWW:am

Approved:

D. W. Robertson
Electronics Technology Laboratory

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

August 9, 1977

COMSAT Headquarters
950 L'Enfant Plaza, S.W.
Washington, D.C. 20024

Attention: Mr. Joseph F. Donnelly

Subject: Monthly Letter Report No. 10
P. O. No. L41819

Gentlemen:

This letter reports Georgia Tech's performance during the month of July on the contract to operate and maintain a COMSAT radiometric receiving terminal in Atlanta, Georgia.

The first two weeks of the month were marked by hot and dry weather while the third and fourth weeks experienced generally overcast skies and rain. The system did not record data on July 6 and 17 due to depletion of the strip chart paper on these days. Intermittent difficulty has been experienced both with the paper take-up reel and the recording pen for the output voltage of the radiometer. The paper and blue ink supplies for the strip chart recorder are extremely low and should be replenished soon.

Respectfully submitted,

Ronald W. Wallace
Project Director

RWW:am

APPROVED:

D. W. Robertson, Director
Electronics Technology Laboratory

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

September 7, 1977

COMSAT Headquarters
950 L'Enfant Plaza, S. W.
Washington, D.C. 20024

Attention: Mr. Joseph F. Donnelly

Subject: Monthly Letter Report No. 11
P. O. No. L41819

Gentlemen:

This letter reports Georgia Tech's performance during the month of August on the contract to operate and maintain a COMSAT radiometric receiving terminal in Atlanta, Georgia.

The weather conditions during the month were mainly characterized by overcast or cloudy skies with scattered rain with the exception of August 10 - 14 when clear conditions were prevalent. Data were collected throughout the period except for a period of about 12 hours on August 8 due to a paper drive problem.

Respectfully submitted

Ronald W. Wallace
Project Director

RWW:am

APPROVED:

D. W. Robertson, Director
Electronics Technology Laboratory

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

September 6, 1977

COMSAT Headquarters
950 L'Enfant Plaza, S.W.
Washington, D.C. 20024

Attention: Mr. Joseph F. Donnelly

Subject: Monthly Letter Report No. 12
P. O. No. L41819

Gentlemen:

This letter reports Georgia Tech's performance during the month of September on the contract to operate and maintain a COMSAT radiometric receiving terminal in Atlanta, Georgia.

A no-cost six month extension of the contract was requested by Georgia Tech since there was a six month delay in delivery of the radiometer. This extension will allow the collection of data for a full year with a termination date of April 5, 1978.

A variety of weather conditions were experienced during the month with some periods of heavy rain near the end of the month. Intermittant problems occurred with the strip chart ink supply and depletion of the paper supply. However, data were collected over about 95 percent of the month.

Respectfully submitted,

Ronald W. Wallace,
Project Director

RWW:am

APPROVED:

D. W. Robertson, Director
Electronics Technology Laboratory

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

November 4, 1977

COMSAT Headquarters
950 L'Enfant Plaza, S.W.
Washington, D.C. 20024

Attention: Mr. Joseph F. Donnelly

Subject: Monthly Letter Report No. 13
P.O. No. L41819

Gentlemen:

This letter reports Georgia Tech's performance during the month of October on the contract to operate and maintain a COMSAT radiometric receiving terminal in Atlanta, Georgia.

Data were collected during only the first two weeks of the month because of a malfunction in the strip chart recorder on October 12. The problem was determined to be in the paper drive motor. Upon notification on that date, COMSAT agreed to send a replacement recorder. To date the recorder has not been received by Georgia Tech and no further data have been recorded.

Respectfully submitted,

Ronald W. Wallace
Project Director

RWW:lb

APPROVED:

D. W. Robertson, Director
Electronics Technology Laboratory

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

December 5, 1977

COMSAT Headquarters
950 L'Enfant Plaza, S.W.
Washington, D.C. 20024

Attention: Mr. Joseph F. Donnelly

Subject: Monthly Letter Report No. 14
P. O. No. L41819

Gentlemen:

This letter reports Georgia Tech's performance during the month of November on the contract to operate and maintain a COMSAT radiometric receiving terminal in Atlanta, Georgia

The replacement strip chart recorder was received and installed on November 13. Calibration on November 14 resulted in the following data.

Weather: clear
Temperature: 19.5° C

Strip Chart deflections -

Hot load: 93 mm
Cold load: 73 mm
Sky: 65 mm
Noise diode: 81 mm
Reference load: 100 mm

Erratic operation of the paper load on the recorder was noted on November 17. On November 28, the paper feed again showed erratic operation and upon inspection it was found that one of the paper drive gears was stripped. The unit was then returned to Comsat Labs for repair or replacement. As a result no data were recorded for the remainder of the month.

Respectfully submitted,

Ronald W. Wallace
Project Director

RWW:am

APPROVED: _____
D. W. Robertson, Director
Electronics Technology Laboratory

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

January 16, 1978

COMSAT Headquarters
950 L'Enfant Plaza, S.W.
Washington, D.C. 20024

Attention: Mr. Joseph F. Donnelly

Subject: Monthly Letter Report # 15
P. O. No. L41819

Gentlemen:

This letter reports Georgia Tech's performance during the month of December on the contract to operate and maintain a COMSAT radiometric receiving terminal in Atlanta, Georgia.

A replacement strip chart recorder was received and installed on December 7. As a result of rainy weather only a partial calibration was performed, which resulted in the following data.

Weather: Overcast Temperature: 15°C

Strip Chart deflections -

Sky:	45 mm
Noise Diode:	60 mm
Reference Load:	88 mm

Beginning in January newspaper weather data will be sent with the strip chart data. This is to allow for a more comprehensive comparison and evaluation of the data.

Blockages of the blue and red ink lines were noted on December 12. On December 16, the paper feed showed erratic operation. Upon inspection it was found that the motor gear was not turning, indicating internal damage to the motor reduction train. The unit was then returned to COMSAT Labs for repair or replacement. As a result, no data were recorded for the remainder of the month.

Respectfully submitted,

Ronald W. Wallace
Project Director

APPROVED:

FOR D. W. Robertson, Director
Electronics Technology Laboratory

A-1913

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

February 23, 1978

COMSAT Headquarters
950 L'Enfant Plaza, S.W.
Washington, D.C. 20024

Attention: Mr. Joseph F. Donnelly

Subject: Monthly Letter Report #16
P.O. No. L41819

Gentlemen:

This letter reports Georgia Tech's performance during the month of January on the contract to operate and maintain a COMSAT radiometric receiving terminal in Atlanta, Georgia.

A replacement strip chart recorder was received and installed on January 4. A calibration was performed, which resulted in the following data.

Weather: Clear Temperature: 11° C

Strip Chart Deflections:

Sky: 65 mm
Noise Diode: 75 mm
Reference Load: 100 mm
Hot Load: 85 mm
Cold Load: 65 mm

The system operated with only a few minor ink and paper problems for the remainder of the month.

Respectfully submitted,

Ronald W. Wallace
Project Director

APPROVED:

D. W. Robertson, Director
Electronics Technology Laboratory

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

March 19, 1978

Comsat Headquarters
950 L'Enfant Plaza, S.W.
Washington, D.C. 20024

Attention: Mr. Joseph F. Donnelly

Subject: Monthly Letter Report # 17
P. O. No. L41819

Gentlemen:

This letter reports Georgia Tech's performance during the month of February on the contract to operate and maintain a COMSAT radiometric receiving terminal in Atlanta, Georgia.

During the month a calibration was performed on February 9 which resulted in the following data.

Weather: Scattered clouds
Temperature: 11°C

Strip Chart Deflections:		
	Sky -	67 mm
	Noise Diode -	83 mm
	Reference Load -	100 mm
	Hot Load -	90 mm
	Cold Load -	70 mm

On about February 17 a Ku band radar was installed on the roof near the radiometer for testing. Interference to the radiometer is exhibited by regular pulses on the strip chart display. In addition a CB radio antenna is also located in the vicinity of the radiometer. When the CB transmitter is keyed this interference shows up as stop to stop excursions of the pen completely obliterating the radiometric data. With the exception of these items and occasional ink and paper problems the system functioned normally during the month.

Respectfully submitted,

Ronald W. Wallace
Project Director

RWW:am

Approved: _____
D. W. Robertson, Director
Electronics Technology Laboratory

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

April 3, 1978

Comsat Headquarters
950 L'Enfant Plaza, S.W.
Washington, D.C. 20024

Attention: Mr. Joseph F. Donnelly

Subject: Monthly Letter Report # 18
P. O. No. L41819

Gentlemen:

This letter reports Georgia Tech's performance during the month of March on the contract to operate and maintain a COMSAT radiometric receiving terminal in Atlanta, Georgia.

During the month calibrations were performed on March 10 and March 23 with the following results.

ITEM	MARCH 10	MARCH 23
Weather:	Scattered Clouds	Clear
Temperature	15°C	27.5°C
Strip Chart Deflections:		
Sky:	72 mm	72 mm
Noise Diode:	87 mm	85 mm
Reference Load:	102 mm	103 mm
Hot Load:	98 mm	96 mm
Cold Load:	80 mm	78 mm

The system functioned normally during the period with the exception of minor ink and paper problems and occasional CB radio and Ku band radar interference.

Respectfully submitted,

Ronald W. Wallace,
Project Director

RWW:am

Approved: _____
D. W. Robertson, Director
Electronics Technology Laboratory